Dissolved Oxygen

Chowan Basin

Total Maximum Daily Load Development

Public Meeting

July 28, 2009

DEQ
VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

MapTech, Inc.

Public comment information

- Comment period ends on…
  - **August 26, 2009**
- Send comments to:
  - Jennifer Howell, VA DEQ
  - 5636 Southern Blvd
  - Virginia Beach, VA 23462
  - Phone: (757) 518-2111
  - Fax: (757) 518-2003
  - Email: jennifer.howell@deq.virginia.gov

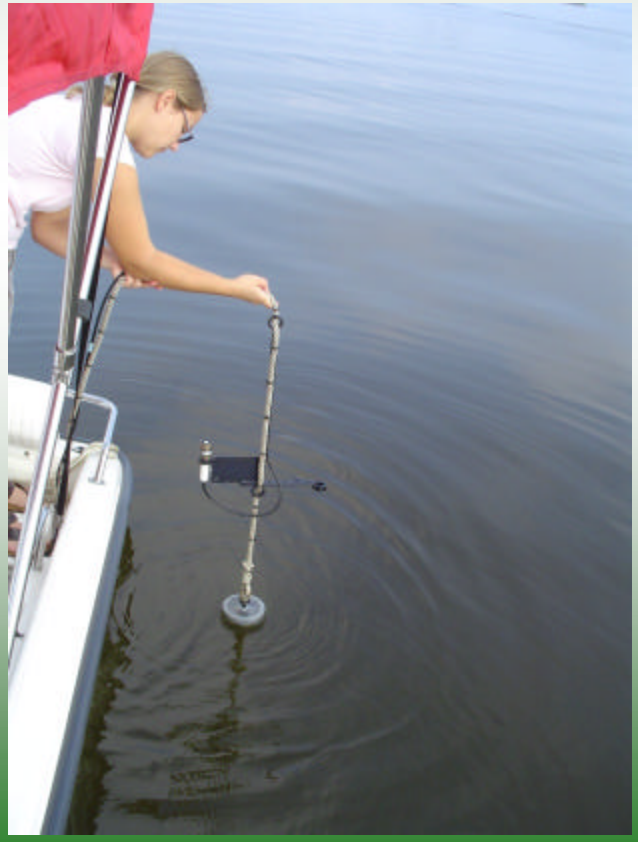
Meeting agenda

- Water Quality Monitoring, Assessment, and TMDL Process
  - Jennifer Howell – VA DEQ
- Source Assessment and TMDL Development
  - Rod Bodkin – MapTech, Inc.
  - James Kern – MapTech, Inc.
- Questions

Water quality monitoring

Physical and chemical parameters are collected in streams and lakes all across the state

- pH
- Temperature
- Dissolved oxygen
- Bacteria
- Nutrients
- Metals
- Toxic pollutants
- Biological communities
- Fish tissue



Data assessment

- Data is compared to Water Quality Standards
  - numeric or narrative limits on pollutants that ensure the protection of human health and of aquatic life
  - criteria used to support Designated Uses
- Water Quality Assessment Report
  - summary of data comparison
  - produces an Impaired Waters list
- Impaired Waters require a TMDL

What is a TMDL

- **TMDL** = **Total Maximum Daily Load**

  maximum amount of a pollutant that can enter a waterbody without violating water quality standards (WQS)

When are TMDLs needed?

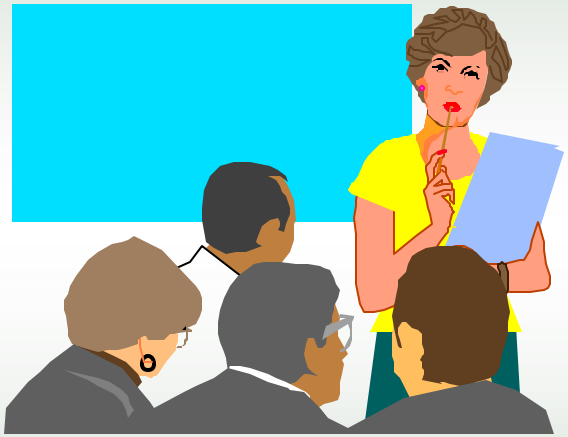
- State and federal laws require TMDLs to be developed for **Impaired Waters (305b/303d Integrated Report)**
- Impaired waters do not meet applicable **Water Quality Standards (WQS)**
- Waters that do not meet WQS do not support their **Designated Use(s)**

Designated uses

- ***All*** Virginia waters are designated for:
  - primary contact recreation (swimming)
  - shellfish growing and consumption
  - aquatic life ★
  - wildlife
  - fishing and fish consumption
  - drinking water

Virginia's TMDL development process

- Public notice for TMDL development
- TMDL study
- Public notice for comments
- Final TMDL report
- EPA approval
- Implementation Planning Process
- Implementation

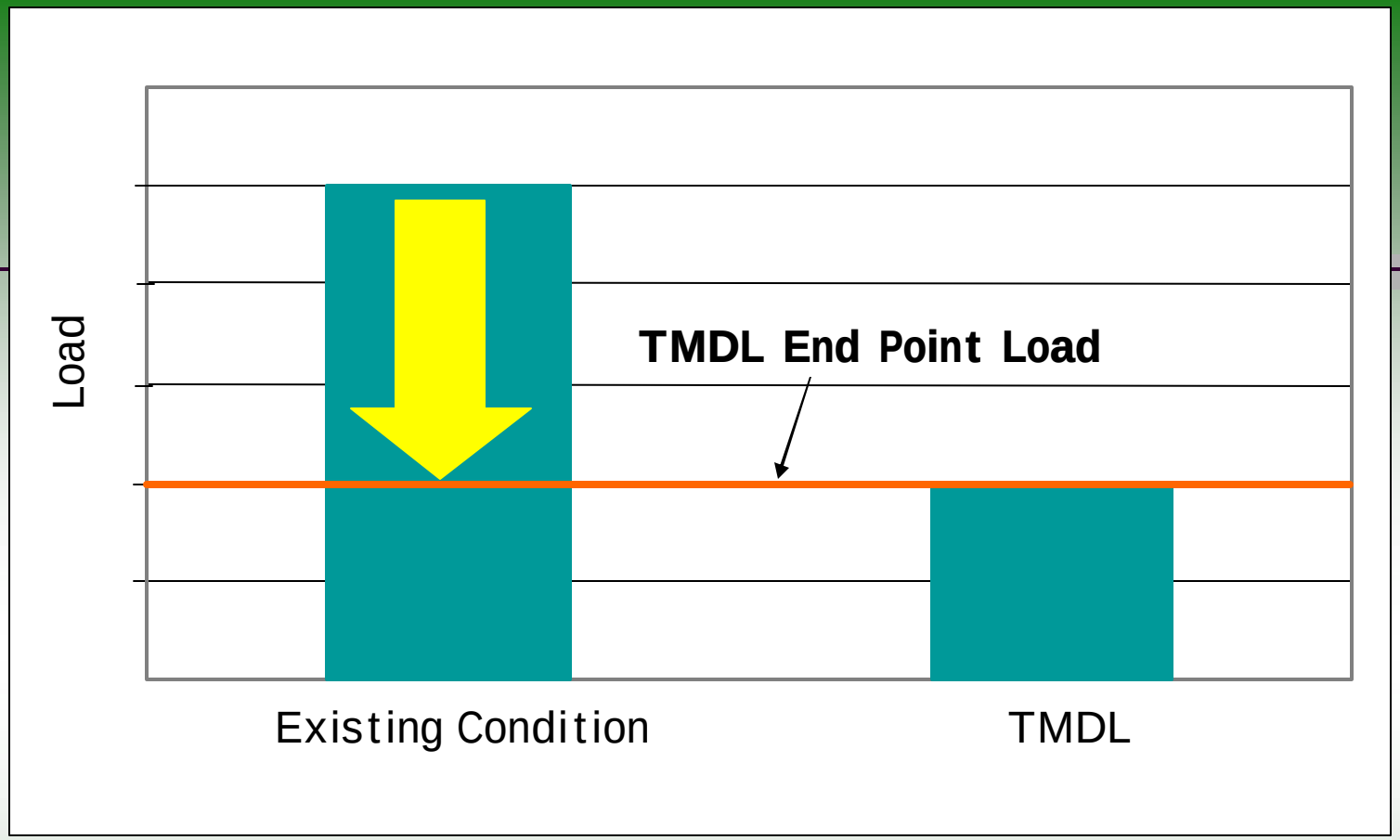


Stakeholder involvement in the TMDL process

- Comment on the proposed TMDL study
- Participate in the development of bacteria TMDLs and staged reduction targets
- Participate in the development of TMDL implementation plans
- Provide and confirm information

How is a TMDL developed?

- Identify all sources of a given pollutant within the watershed
- Calculate the amount of pollutant entering the stream from each source



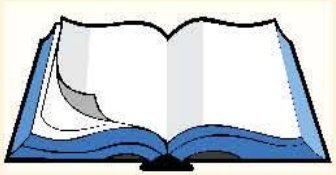
- Calculate the pollutant reductions needed, by source, to attain water quality standards
- Allocate the allowable load to each source and include a margin of safety

The State begins a formal process to clean up that water body (a TMDL)

Study

- Identifies sources of pollution
- Calculates amounts from each source
- Estimates necessary pollutant reductions

Implementation Plan

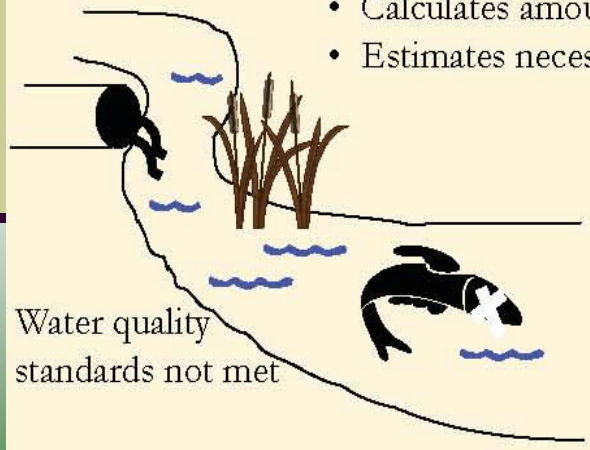


- Identifies permit controls or best management practices needed to make necessary pollutant reductions

Implementation

Monitoring

Polluted



Water quality standards not met

Clean

Water quality standards met

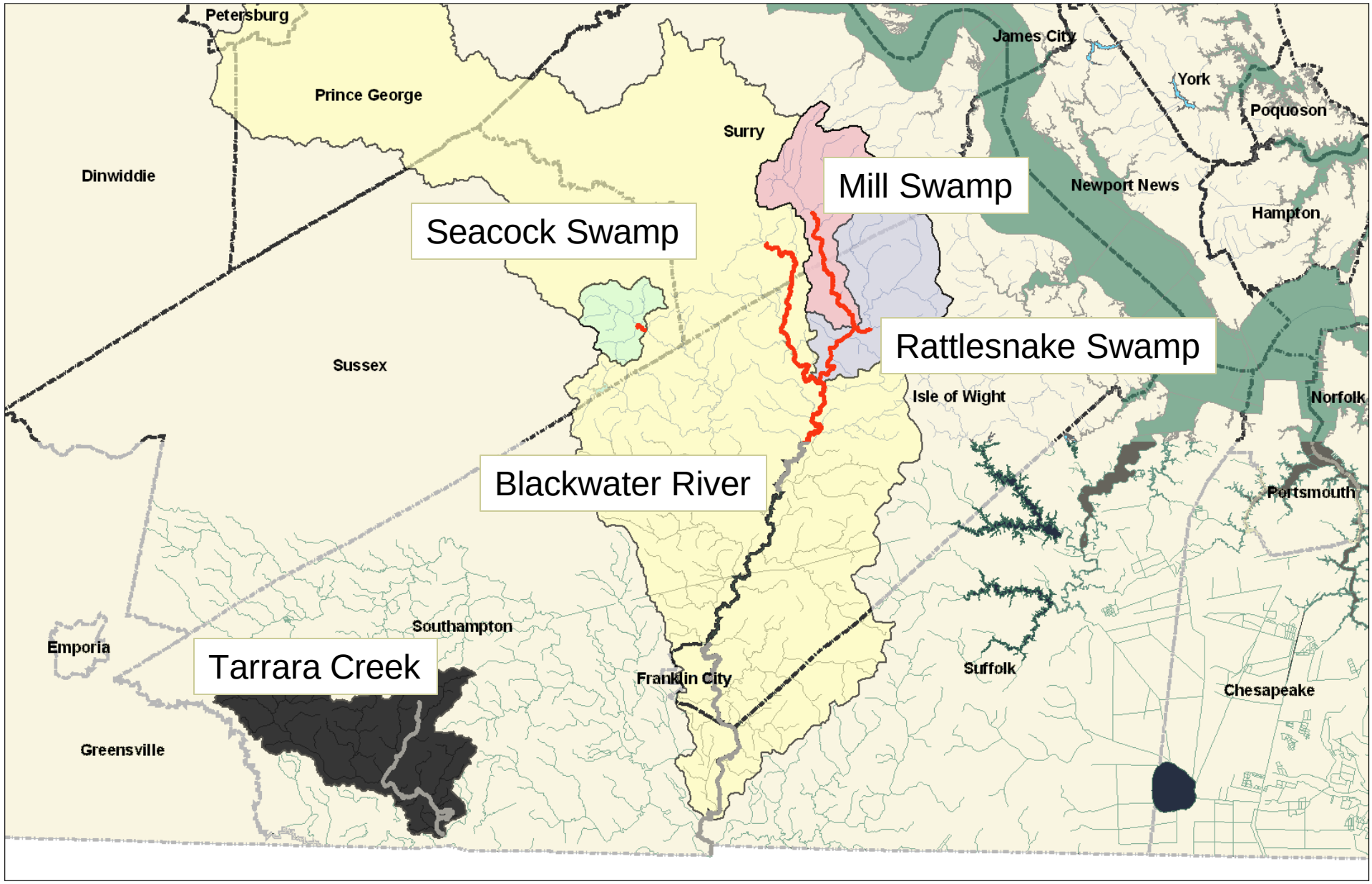
The Process

Created by Robert Brent, DEQ

Natural Conditions Report / TMDL study

Chowan River Sub-basin

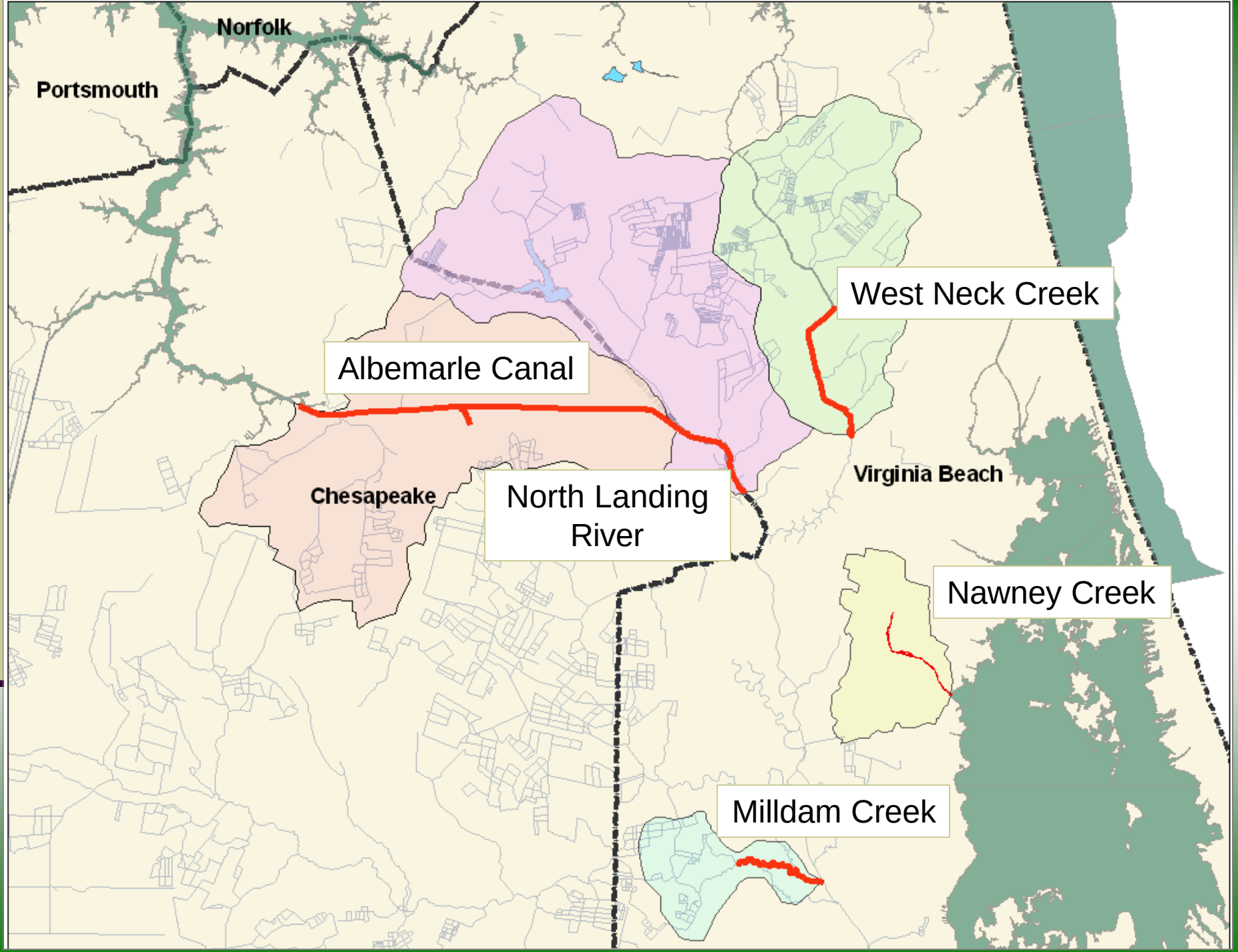
	Initial Listing Year	
Tarrara Creek	1996	Southampton
Mill Swamp	1998	Isle of Wight Surry
Rattlesnake Swamp	1998	Isle of Wight Surry
Seacock Swamp	1998	Southampton Isle of Wight
Blackwater River (mouth-lower-middle-upper)	1996-2006	Southampton Isle of Wight


Petersburg
Prince George
Surry
James City
York
Poquoson
Dinwiddie
Mill Swamp
Newport News
Hampton
Seacock Swamp
Rattlesnake Swamp
Sussex
Isle of Wight
Norfolk
Blackwater River
Portsmouth
Southampton
Emporia
Tarrara Creek
Franklin City
Suffolk
Chesapeake
Greensville

TMDL study

Dismal Swamp/Albemarle Sound Sub-basin

	Initial Listing Year	
Nawney Creek (upper)	1996	Virginia Beach
Nawney Creek (lower)	2008	Virginia Beach
Milldam Creek (lower)	2002	Virginia Beach
West Neck Creek (middle)	1998	Virginia Beach
Albemarle Canal	2002	Virginia Beach Chesapeake
North Landing River (middle)	2002	Virginia Beach Chesapeake


Norfolk
Portsmouth
West Neck Creek
Albemarle Canal
Chesapeake
North Landing River
Virginia Beach
Nawney Creek
Milldam Creek

Dissolved Oxygen Water Quality Standards

9 VAC 25-260-50. Numerical criteria for dissolved oxygen, pH, and maximum temperature.***

CLASS	DESCRIPTION OF WATERS	DISSOLVED OXYGEN (mg/L)****		pH	Maximum Temp. (ºC)
		Min.	Daily Avg.		
I	Open Ocean	5.0	--	6.0-9.0	--
II	Tidal Waters in the Chowan Basin and the Atlantic Ocean	4.0	5.0	6.0-9.0	--
II	Tidal Waters in the Chesapeake Bay and its tidal tribuaries	see 9 VAC 25-260-185		6.0-9.0	
III	Nontidal Waters Coastal and Piedmont Zones	4.0	5.0	6.0-9.0	32
IV	Mountainous Zones Waters	4.0	5.0	6.0-9.0	31
V	Stockable Trout Waters	5.0	6.0	6.0-9.0	21
VI	Natural Trout Waters	6.0	7.0	6.0-9.0	20
VII	Swamp Waters	*	*	4.3-9.0*	**

*This classification recognizes that the natural quality of these waters may fall outside of the ranges for D.O. and pH set forth above as water quality criteria; therefore, on a case-by-case basis, criteria for specific Class VII waters can be developed which reflect the natural quality of the waterbody. Virginia Pollutant Discharge Elimination System limitations in Class VII waters shall meet pH of 6.0 - 9.0.

Possible causes for low Dissolved Oxygen

- **Low flow**
- **High temperature**
- **High carbon deposition**
- **Low surface exchanges**
- **Caused by both natural condition and human impact**

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TMDL information: www.deq.virginia.gov/tmdl

WQ Assessment: www.deq.virginia.gov.wqa